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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/665,137

09/18/2003

Torsten Gerlich

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05/04/2006

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EXAMINER

KITOV, ZEEV V

ART UNIT

PAPER NUMBER

2836

DATE MAILED: 05/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,137

Applicant(s)

GERLICH ET AL.

Examiner

Zeev Kitov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Examiner acknowledges a submission of the Appeal Brief filed on February 15, 2006. Since the Final Action filed on June 28, 2005 includes one typing error leading to erroneous interpretation of the reference by the Appellant, the Prosecution is reopened.

In view of the Appeal Brief filed on February 15, 2006, PROSECUTION IS HEREBY REOPENED. No new grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 - 3, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Busato (WO 99/06893) in view of Maller (US 6,256,185). Busato discloses most of the elements of Claim 1 including the electromagnetic valve being actuated by pulse-width modulation and having a pulsed mode and a proportional mode having a higher frequency than the pulsed mode (Specification, page 7, lines 4 – 34), a solenoid (element 46 in Fig. 4) a power source for supplying the solenoid with electricity (+14.0 VDC in Fig. 4); a control unit (element 113 in Fig. 4) generating pulse-width-modulated signals (upper trace in Fig. 9); a switching device (element 26b in Fig. 4), the solenoid receives the pulse-width-modulated signals of the control unit via the switching device. However, it does not disclose a suppression device. Maller discloses the suppression device (elements D3 in Fig. 4) suppressing induced high voltages at the solenoid. Both references have the same problem solving area, namely providing solenoid valve activation system. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Busato solution by adding the protecting diodes according to Maller, because as Maller states (col. 7, lines 40 – 58), these diodes help to protect transistor against transients and help to reduce a power dissipation.

Regarding Claim 2, Maller discloses the suppression device as a free-wheeling diode (element D3 in Fig. 4) connected in parallel to the solenoid. A motivation for modification of the primary reference is the same as above.

Regarding Claim 3, Busato discloses the valve being actuated in a proportional mode with a pulse frequency of 200 Hz (Specification, page 16, line 34 – page 17, line2)

Regarding Claim 7, Busato discloses the switching device as a power transistor (element 26a in Fig. 4).

Regarding Claim 8, Maller discloses a diode (element Z3 in Fig. 4) connected in parallel to the power transistor. A motivation for modification of the primary reference is the same as above.

Claims 5, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Busato in view of Maller and Klotz et al. (US 4,915,204). As was stated above, Busato and Maller disclose all the elements of Claim 1. However, regarding Claim 5, they do not disclose the power source including the vehicle's electrical system. Since the Klotz et al. invention is intended for use for motor vehicle (col. 1, lines 7 – 15), its solenoid valve actuation system (element 3280 in Fig. 27B) is inherently fed by the vehicle's electrical system. Both references have the same problem solving area, namely providing solenoid valve activation system. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the modified the Busato solution by applying it in the motor vehicle engine system, because such

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application would substantially expand the market of the Maller control system manufacturer.

Regarding Claim 6, Klotz et al. disclose the solenoid valve actuation system (elements 3250 and 3280 in Fig. 27B, col. 108, lines 22 - 35), which is a part of transmission control system (element 3050 in Fig. 27A) controlled in turn by the engine controller (element 3020 in Fig. 27A, col. 45, line 42 – col. 47, line 46). A motivation for modification of the primary reference is the same as above.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Busato in view of Maller and Stumpf (US 4,851,959). As was stated above, Busato and Maller disclose all the elements of Claims 1 and 3. Claim 4 differs from Claim 3 by a value of the activation frequency equal to 50 Hz. Stumpf states that the frequency is selected to satisfy conditions of series resonance in the LC tank of the activation circuit (elements 14 and 25 in Fig. 4). It is clear therefore, that with a change of the solenoid inductance and the capacitor value, the frequency should be adjusted accordingly. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the activation frequency to some specific value according to Stumpf (including 50 Hz), because as Stampf states (col. 1, line 67 – col. 2, line 6), the frequency is to be set such to satisfy conditions of a series resonance in the LC tank, which is further used for detection of a plunger position. For some combination of the inductance and capacitance, a preferable frequency is 70 Hz, for other, it would be 50 Hz. It is obvious therefore, that a particular frequency can changes according to

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selection of the valve inductance and the capacitor value. Selection of particular frequency in such case is a designer's routine task.

Response to Arguments

Applicant's arguments filed on February 15, 2006 have been fully considered but they are not persuasive.

1. Applicant in his Appeal Brief argues that he has obtained unexpected results, such as reduction of noise due to use of free - wheeling diodes while permitting adequate response times (page 4, paragraph 3). In response to Appellant's argument that he allegedly obtained results not contemplated by prior art, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Additionally, the noise reduction function has not been claimed and therefore has not been addressed in the Examination. In response to Appellant's argument that the references fail to show certain features of Applicant invention, such as the noise reduction, it is noted that the features upon which applicant relies (i.e. obtaining unexpected results, such as reduction of noise) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the

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specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

2. Examiner agrees with a notion that the transient protection devices disclosed by Maller (D3 and Z3) are well known in the art and widely used as standard protection devices (page 4, paragraph 4). But it does not disqualify the reference from being used in the claim rejection.

Applicant mischaracterizes Maller invention alleging: “Maller provides a continuous voltage during solenoid work and seeks to suppress surges during this” (page 7, paragraph 4). According to Maller, col. 8, lines 14 – 19), “In the case of the preferred embodiment 10 described herein, the pulse width modulation duty cycle in the continuous hold mode is thirteen percent (13%)”. The pulse width mode by no means “provides a continuous voltage”; it seems that Applicant confused the continuous hold mode with the continuous voltage. Besides that, as well known in the art, surges appear across the solenoid only when the voltage supply is disconnected (switched-off); that causes generation of the over-voltage surge. Therefore, the over-voltage protection devices act and protect the circuit not at the time of the continuous voltage, as Applicant suggests, but at the time of discontinuing the pulse. Therefore, in this aspect Maller is not teaching away reference.

3. Applicant further contends: “It has surprisingly been found that the use of the free wheeling diodes in proportional and pulsed mode control devices actually reduces noise

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for the control signals while still permitting adequate response times". To the best Examiner's understanding, the Applicant alleges that by using the free wheeling diodes he achieved substantial reduction of the peak voltage associated with switching off the driving transistor while maintaining adequate response times. The free wheeling diodes use is well known in the art. The adequate response times are interpreted as the response times short enough in relation to the shortest pulse duration associated with the highest frequency. Maller reference includes a detailed description of his circuit using well - known in the art 555 timer and giving every part value. Simple calculations show that his pulse width modulated signal has a frequency around 1000 Hz, which substantially exceeds the Applicant's frequency range of 20 – 200 Hz. Therefore, if the Maller's response times are adequate for 1000 Hz frequency, they are absolutely adequate for the Applicant's top frequency of 200 Hz. Accordingly, Maller discloses the system having reduced noise i.e. reduced peak voltages by using the free wheeling diodes, while still permitting response times absolutely adequate for his and the Applicant's purpose. The Argument of surprising discovery is non-convincing.

4. Applicant further contends: "the highly controlled Busato device has not been seen as needing suppression devices as the voltage is controlled via pulse modulation" (page 7, paragraph 5). Examiner disagrees with that. As well known in the art, whenever the voltage supply to the solenoid is disconnected (switched-off), the voltage surge appears across the solenoid. An evidence for that is that Maller's system using the high frequency (about 1000 Hz) pulse width modulation includes the suppression

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devices (diodes D3 and Z3 in Fig. 4). Therefore, the pulse width modulation control of the solenoid (including the Busato system) inevitably demands the over-voltage protection devices.

Applicant further continues the same sentence: "also it was thought that the suppression devices would impact the response times". Given above analysis of the Maller system shows that the response times achieved by Maller's system having frequency of 1000 Hz are absolutely sufficient for the Applicant's system having maximum frequency of 200 Hz. Therefore, the Busato device does need the suppression devices and application of Maller's solution does not impair its response times.

5. Applicant further alleges: "Nothing in Maller teaches the use of a suppression device for continuous voltage control of Maller in such dual pulse mode as disclosed by Busato" (page 4, 5th paragraph), i.e. Maller does not disclose continuous voltage control mode. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

At the same time, the Busato's system performs a continuous voltage control by using the same pulse width modulation control as Maller. "The average current through the coil is correlated with the degree of modulation of the PWM voltage waveforms so

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that modulation of the waveform will control the fluid flow" (Busato, page 7, lines 11 – 14). According to Maller, col. 8, lines 14 – 19), "In the case of the preferred embodiment 10 described herein, the pulse width modulation duty cycle in the continuous hold mode is thirteen percent (13%)". Both inventors use the pulse width modulation control of the solenoid.

According to Busato (page 6, line 31 – page 7, line 3), the dual pulse control mode is nothing but the pulse width modulated high frequency signal being modulated (interrupted) by a low frequency signal (as shown in Fig. 9). Therefore, the core of the problem of performing the surge suppression while "still permitting adequate response times" lies in the application of high frequencies. As was stated above, Maller uses the frequency of about 1000 Hz, which is substantially higher than the Busato's 200 Hz. Therefore, the Maller's solution of the surge protection can be directly installed in the Busato's system. And the Maller reference does not teach away from Busato's concept.

In view of foregoing, none of the Arguments that one of the references teaches away seems to be convincing and the combination of both references is proper.

6. As to Argument regarding Claim 8, it is moot in view of correction of typing error in Claim 8 rejection.

Conclusion

Applicant's amendment to the Non-Final Action dated February 25, 2005 necessitated the new ground(s) of rejection presented in this Office action. Accordingly,

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THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose current telephone number is (571) 272 - 2052. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272 – 2800, Ext. 36. The fax phone number for organization where this application or proceedings is assigned is (703) 872-9306 for all communications.

4/28/2006



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